

Renewable Energy Policy

An informational webinar for Maryland's Smart Energy Communities

May 13, 2013 at 10 am

Hosted by the University of Maryland Environmental Finance Center and the Maryland Energy Administration

Maryland Energy ADMINISTRATION
Powering Maryland's Future

MARYLAND

Outline

- Review of Goals and Deliverables
- Baseline Development
- Policy Structure
- Renewable Energy Assessment Plan
- Projects – Selecting and Financing

Renewable Energy Goal

Replace conventional centralized electricity generation serving a local government by 20% with distributed, renewable energy generation by 2022.

Baseline: CY 2012 = 5 Million kWh consumed

Target: CY 2022 = 1 Million kWh from renewable resources

Maryland Energy ADMINISTRATION
Powering Maryland's Future

MARYLAND

Three Deliverables

DUE BY DECEMBER 31, 2013

- Select baseline year and calculate electricity consumption.
- Pass a policy committing the local government to renewable goal.
- Develop a Renewable Energy Action Plan (REAP) for increasing electricity from renewable resources.

Baseline development

- If your community is pursuing the energy efficiency policy (last week's webinar), then the renewable energy baseline year should be the same as the energy efficiency baseline.
- If your community is NOT pursuing the energy efficiency policy, then we suggest communities set their baseline year to the most recent year of data, or CY 2012.
  - Speak with MEA/EFC if you would like to do something different.

Baseline development

- What buildings/facilities to include
- How to select a baseline year
- Process for documenting baseline

Baseline – What to include?

- Baseline should include all divisions and departments of the local government:
  - municipal buildings
  - drinking water
  - wastewater treatment plants
  - pumping stations
  - other facilities owned by the community

Baseline – What to include?

- Optional facilities to include in baseline (please discuss with MEA):
  - Street lights (High electricity per square ft)
    - Mandatory if you want funding for street light project.
  - Parking garages (Low electricity per square ft)
- Working with a subset of buildings (discuss with MEA):
  - The baseline must represent a minimum of 75% of the community's total electricity consumption.

Baseline – Selecting a year

- Things to consider:
  - What is your most current year of complete data?
  - What recent energy efficiency improvements have been made and what are the expected savings?
  - What new buildings came online in past 5 years?
  - How many years do you need to meet the reduction goal?
  - 2009 is the earliest baseline year allowed
    - Requires community meet goal by end of 2014
  - Preference is Calendar Year reporting

Baseline – Documentation Process

- Two Options:
  - If you currently track electricity using Portfolio Manager (or other tool), then generate a report:
    - Make sure report includes all buildings and is consistent with the building stock you want to submit as baseline.
  - If you don't currently track electricity, or its easier than generating a report, input electricity data to MEA provided excel document (See MSEC website):
    - Building name and street address
    - Building age and size (gross square feet)
    - 12 consecutive months of electricity bills
    - Amount of electricity provided by renewable sources

Name of Local Government:	Example Town
Baseline Year:	2012

Building Type	Building Size	Electricity: Conventional	Electricity: Renewable Energy	Total kWh	Electricity Intensity
	Square Feet	kWh	kWh		Total kWh/sq-ft
Town Hall	7,500	450,000	0	450,000	60.00
Police Station	10,000	650,000	0	650,000	65.00
Elementary School	7,500	400,000	10,000	410,000	54.67
Senior Center	5,000	400,000	0	400,000	80.00
Subtotal for Buildings	30,000	1,900,000	10,000	1,910,000	63.67
Water Treatment Plant	7,500	650,000	20,000	670,000	89.33
Waste-Water Treatment	10,000	950,000	20,000	970,000	97.00
Pumping in Aggregate	2,500	1,450,000	0	1,450,000	580.00
Total	50,000	4,950,000	50,000	5,000,000	100.00

Policy Structure

- The policy is to establish the ***goal***
- The goal is to provide 20% of community's electricity needs from renewable resources by 2022.
  - The goal may be more aggressive
- It is up to communities to determine which form of legislation is most suitable. Acceptable legislation includes:
  - Ordinances
  - Resolutions
  - Executive Orders
  - Others (please discuss with MEA)

Policy Structure

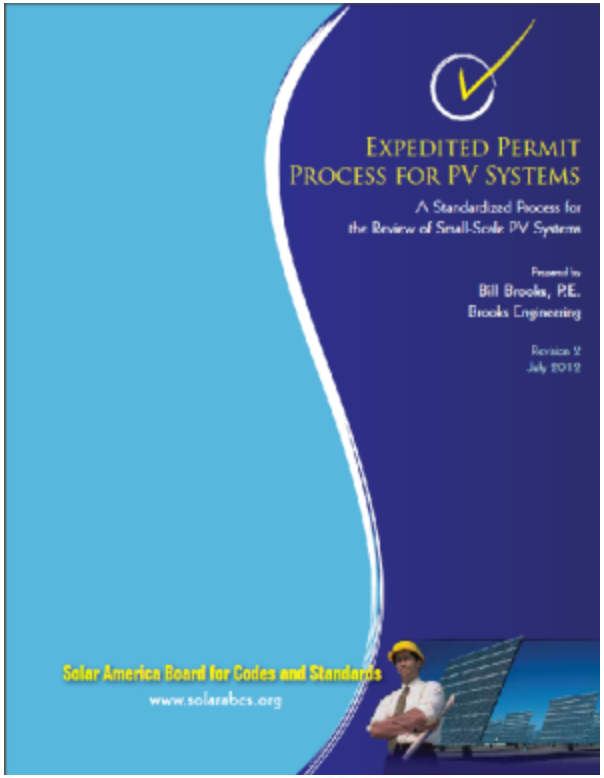
- Qualifying renewable energy technologies include:
  - Solar PV, for electricity generation
  - Solar Thermal, for water or space heating
  - Geothermal, for space heating & cooling and hot water
  - Wind, for electricity generation
  - Biomass, to combust to generate heat and/or electricity
  - Methane from Anaerobic Digestion, to combust to generate heat and/or electricity
  - Waste-to-energy, for electric or thermal energy

Renewable Energy Action Plan (REAP) - Overview

- At a minimum, the REAP is expected to include:
  1. Letters from the local government verifying adoption
  2. Executive Summary with community characteristics, overview of electricity consumption, existing renewable capacity, and outline for reaching 20% goal
  3. Energy use baseline (identical to EE policy)
  4. Detailed renewable energy action plan
  5. List of resources (websites, tools, etc.) used

Renewable Energy Action Plan (REAP) - Overview

- The REAP will provide a realistic path for building renewable capacity and meeting the goal.
  - Local municipalities can "lead by example" by developing strategies that affect both government and private sector
    - E.g., by adopting best practices for renewable energy permitting and inspection, both sectors would benefit
    - Often, municipalities find renewable energy procurement to be a challenge; MEA can provide RFP and PPA (coming up later!) templates



Policy Summary

- Three deliverables by December 31, 2013. Make sure your timetable includes all three:
  - Baseline
  - Policy Adopted
  - Renewable Energy Assessment Plan

  - Upcoming webinars:
    - May, 16th: Trans Petroleum Reduction Guidelines
    - May 29th: Low/Moderate Income Grant Guidelines
    - TBD: Energy Audits 101, Procurement, Financing

Step 1 – Assess existing renewable capacity

- If your community does not have any renewable generation capacity, then skip this step.
- If your community has renewable generation capacity, then use the excel worksheet provided by MEA to figure out what portion of the 20% your community already has installed. You'll need the following:
  - Type of renewable resource
  - Capacity or size of installed systems (kW)
  - Capacity factor (see spreadsheet on next page)
  - Ownership
    - Verify that the municipality can claim energy

Step 1 – Assess existing renewable capacity

	1	2	3	4
1	**Renewable Energy Technology Annual Generation Worksheet**			
2	**Technology**	**Capacity**	**Capacity Factors and Conversions**	**Annual kWh**
3	***Solar Water Heating***	*Units = sq. ft.*	*kWh/yr/sq. ft.*	
4		250.00	54	**13,500**
5	***Solar PV***	*Units = kW*	*14% CF= 1,227 hrs/yr*	
6		100.00	1,227	**122,700**
7	***Geothermal Heating & Cooling***	*Units = tons*	*(1 ton = 3.5 kW) x (21% CF = 1840 hrs./yr.)*	
8		10.00	6,443	**64,430**
9	***Wind Turbines***	*Units = kW*	*30% CF = 2,630 hrs./yr*	
10		50.00	2,630	**131,500**
11				
12				
13	**Instructions:** Enter capacity into bright yellow boxes to calculate annual energy generation in kWh.			

Existing Capacity Calculation

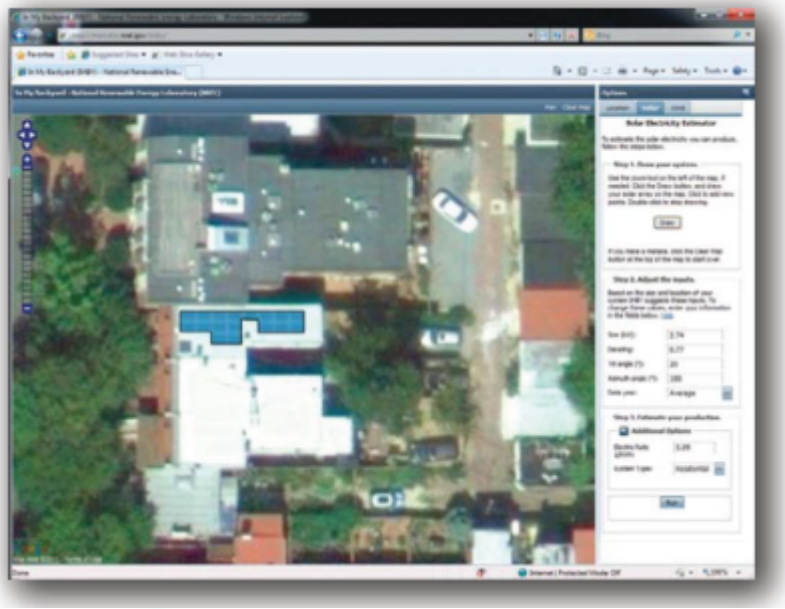
Renewable Resource	Capacity (kW)	Generation (kWh)	Financing
Solar PV	200	245,420	General Fund
Geothermal	17.5	32,211	MEA Grant
TOTAL RENEWABLE GEN.		277,631	
TOTAL ELECT. CONSUMPTION		10,000,000	
EXISTING CAPACITY %		3.3%	
ADDITIONAL CAPACITY NEEDED		16.7%	

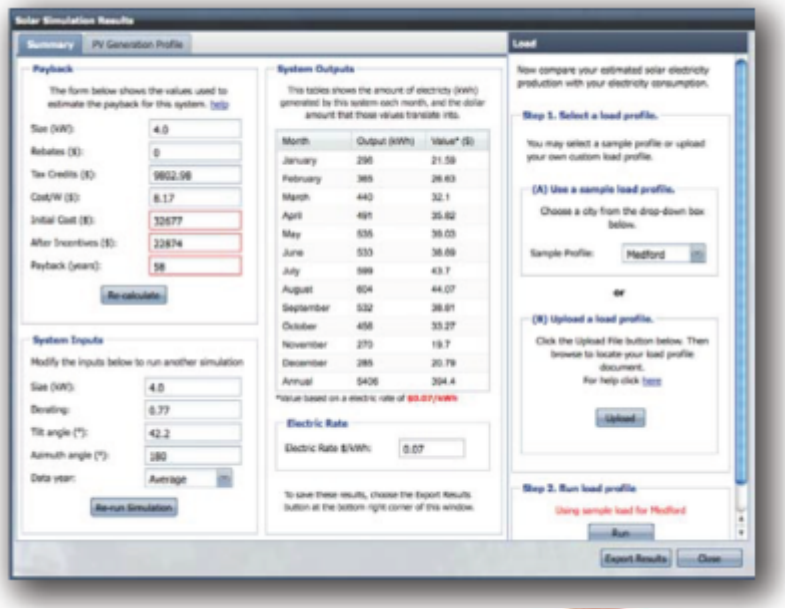
Step 2 – Assess potential for new renewable generation capacity

- Evaluate open sites that can host renewable capacity:
  - Building rooftops, for solar PV and solar water heating
  - Open land areas, for solar PV
  - Landfills, for solar PV
  - Wastewater treatment plants, for solar PV, anaerobic digester gas
- Consider the size, condition and multiples uses of both existing and new space
  - More resources on siting renewable capacity to come

Step 2 – Assess potential for new renewable generation capacity

- IMBY
  - Can trace available space on rooftop to find capacity





Step 2 – Assess potential for new renewable generation capacity

- PV Watts
  - Uses MD solar data to calculate costs, payback, etc.

PVWatts AC Energy & Cost Savings

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Baltimore
State:	Maryland
Latitude:	39.18° N
Longitude:	76.67° W
Elevation:	47 m
PV System Specifications	
DC Rating:	500.0 kW
DC to AC Derate Factor:	0.785
AC Rating:	392.5 kW
Array Type:	Fixed Tilt
Array Tilt:	39.2°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	7.8 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	3.47	43222	3371.32
2	4.40	49234	3840.25
3	4.79	56973	4443.89
4	5.12	57625	4494.75
5	5.28	59049	4605.82
6	5.70	59278	4623.68
7	5.61	60128	4689.98
8	5.28	56587	4413.79
9	4.95	52224	4073.47
10	4.90	56095	4375.41
11	3.50	41344	3224.83
12	2.85	34497	2690.77
Year	4.66	626255	48847.89

PVWatts

Click on **Calculate** if default values are acceptable, or after selecting your system specifications. Click on **Help** for information about system specifications. To use a DC to AC derate factor other than the default, click on **Derate Factor Help** for information.

Station Identification:

WBAN Number:	93721
City:	Baltimore
State:	Maryland

PV System Specifications:

DC Rating (kW):	500.0
DC to AC Derate Factor:	0.785 (Derate Factor Help)
Array Type:	Fixed Tilt

Fixed Tilt or 1-Axis Tracking System:

Array Tilt (degrees):	39.2	(Default = Latitude)
Array Azimuth (degrees):	180.0	(Default = South)

Energy Data:

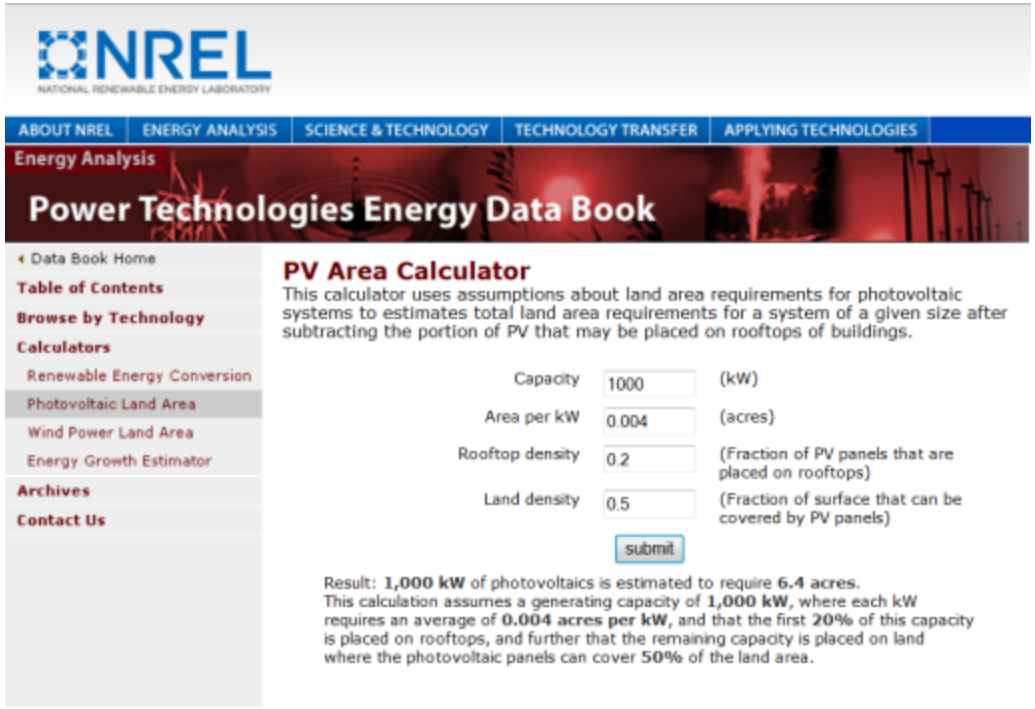
Cost of Electricity (cents/kWh):	Default = State Average

Maryland Energy ADMINISTRATION
Powering Maryland's Future

MARYLAND

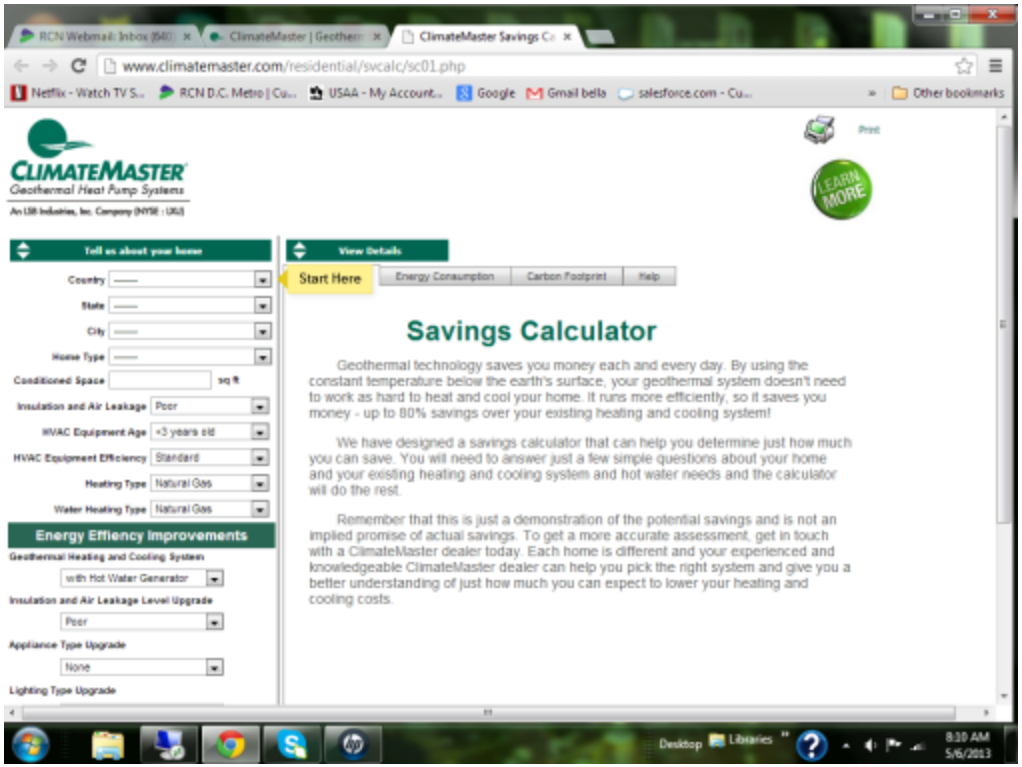
Step 2 – Assess potential for new renewable generation capacity

- PV Area Calculator
  - Calculates land needed for ground mount PV



Step 2 – Assess potential for new renewable generation capacity

- Geothermal Heating & Cooling Savings Calculator
  - Buildings use 2/3rd of energy for heating and cooling
  - Calculates savings, payback, etc.



Maryland Energy ADMINISTRATION
Powering Maryland's Future

MARYLAND

Step 3 – Renewable energy projects output and financing

- Identify specific renewable energy projects the community would like to complete to meet the 2022 goal considering the following:
  - Capacity
  - Location
  - Conventional electricity savings
  - Project financing

Step 3 – Renewable energy projects output and financing

Year	Revenues		Running Balance
	Electricity	SRECs	
2013	$0	$0	$0
2014	$981,600	$2,944,800	-$18,957,050
2015	$981,600	$2,454,000	-$15,521,450
2016	$981,600	$1,963,200	-$12,576,650
2017	$981,600	$1,472,400	-$10,122,650
2018	$981,600	$981,600	-$8,159,450
2019	$981,600	$981,600	-$6,196,250
2020	$981,600	$981,600	-$4,233,050
2021	$981,600	$981,600	-$2,269,850
2022	$981,600	$981,600	-$306,650
2023	**$981,600**	**$490,800**	**$1,165,750**
2024	**$981,600**	**$490,800**	**$2,638,150**
2025	$981,600	$490,800	$4,110,550
2026	$981,600	$490,800	$5,582,950
2027	$981,600	$490,800	$7,055,350
2028	$981,600	$490,800	$8,527,750
2029	$981,600	$490,800	$10,000,150
2030	$981,600	$490,800	$11,472,550
2031	$981,600	$490,800	$12,944,950
2032	$981,600	$490,800	$14,417,350

Maryland Energy ADMINISTRATION
Powering Maryland's Future

MARYLAND

Selecting/Financing Project

Coppin State University – Ballasted Rooftop Mount

Frederick County Oakdale High School – Ballasted Rooftop Mount

Talbot County Community Center – Ground Mount

Maryland Energy ADMINISTRATION
Powering Maryland's Future

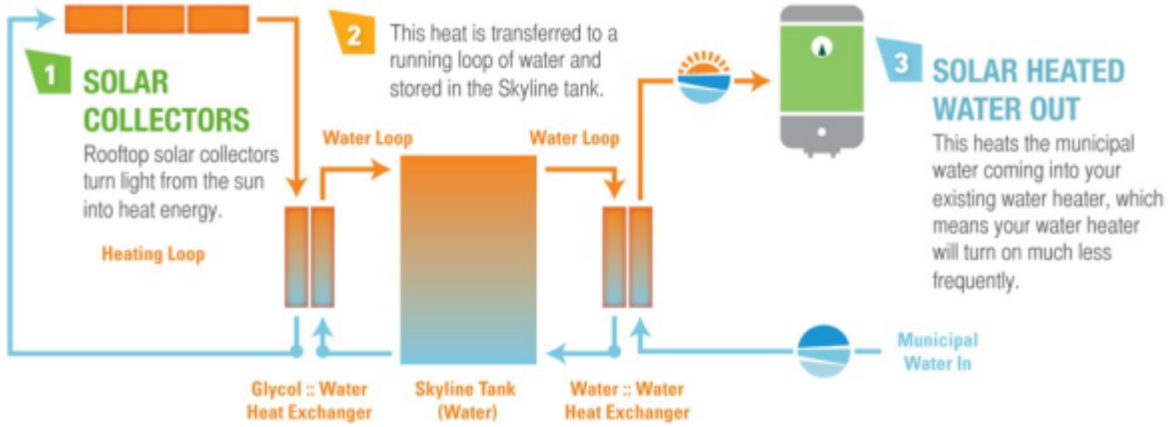
MARYLAND

Selecting/Financing Project

- Power Purchase Agreements
  - Allows State/local governments to partner with third-party solar developers to take advantage of federal incentives
    - 30% ITC
    - MACRS
  - No upfront capital cost to State/local governments
  - No system performance or operating risk to State/local governments
  - Predictable energy pricing
    - If net metered, full retail rate offset
    - Ideally at lower costs than conventional grid power
  - Solar developer or State/local governments can sell SRECs to create revenue stream

Selecting/Financing Project

- Solar Water Heating Leasing
  - Solar hot water priced at fixed discount (indexed) to utility rate
    - 30% energy/cost savings typical
  - No upfront cost to customer
  - 10 year contract term, can buy at market rate



Grant Funding Rules of Thumb

GENERAL RULES OF THUMB

- MEA will only pay for projects that have a payback that is less than the useful life of the equipment.
  - If the project does not have a payback that is less than the useful life, MEA will only pay an incremental cost calculated based on useful life.
- Communities may access 20% of the SEC grant funding upon signing the grant agreement, but before completing the deliverables. This funding can be used to assist in passing policies and developing REAPs.